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CHITONS COLLECTED BY DR. HAROLD HEATH AT PACIFIC GROVE,  
NEAR MONTEREY, CALIFORNIA.

BY H. A. PILSBRY.

During the summer of 1897 Dr. Heath collected a series of invertebrates and fishes for the Academy, including some twenty-four species and varieties of Polyplacophora. As he has kindly engaged to collect again during the present season, a full report on the Chitons, with illustrations of new, unfigured and unusual forms may be deferred until further specimens come to hand; but it may be well to enumerate the forms already seen, and describe two which seem to be new.

It is evident that the *Mopalias* require more study than has yet been given them. At Pacific Grove, the typical *muscosa*, typical *lignosa* and typical *Hindsii* occur, without, so far as the series seen shows, any specimens of intermediate character. The reference of these to one species may, therefore, have been premature. A *Mopalia* described below, differs from those hitherto known in the perfectly regular form of the tail valve, which is like that of *Ischnochiton*, thus breaking down, in large measure, the distinction between the *Ischnochitonidae* and the *Mopaliidae*. This lawless species is new, and I have given myself the pleasure of associating the name of my friend Dr. Heath with it.

The occurrence of two seven-valved adult monsters is also notable. I shall return to these on a later occasion.

LEPIDOPLEURIDÆ.

*Lepidopleurus rugatus* Cpr.

*Lepidopleurus nexus* Cpr.

ISCHNOCHITONIDÆ.

*Tonicella lineata* Wood.

*Trachydermon* (Cyanoplax) *Raymondi* Pils.

A small form of the species, occurring in tide pools.

*Trachydermon* (Cyanoplax) *Hartwegi* Cpr.

*Ischnochiton radians* Cpr.

This species is very similar to *I. interstinctus* Gld., but the teeth are longer and the slits decidedly deeper.

*Ischnochiton scabricostatus* Cpr. var.

*Ischnochiton regularis* Cpr.

One specimen has but seven valves, but in all other respects is perfectly normal.

*Ischnochiton Mertensii* Midd.

*Ischnochiton Cooperi* Cpr.

*Ischnochiton* (*decipiens* var.?) *sinudentatus* Cpr.

*Ischnochiton* (*Stenoradsia*) *Magdalenensis* Hinds.

*Callistochiton crassicostatus* Pils.

*Callistochiton palmulatus* var. *mirabilis* Pils.

*Chætopleura gemmea* Cpr.

*Nuttallina Californica* 'Nutt.' Rve.

*Nuttallina Thomasi* Pilsbry, n. sp.

In tide pools with *Tr. Raymondi*. See below.

#### MOPALIIDÆ.

*Mopalia muscosa* Gld. Typical.

*Mopalia muscosa lignosa* Gld. Typical.

*Mopalia muscosa Hindsii* 'Sow.' Rve. Typical.

*Mopalia Heathii* Pilsbry. See below.

*Mopalia ciliata* Sow. Typical.

*Placiphorella velata* Cpr.

#### ACANTHOCHITIDÆ.

*Katharina tunicata* Wood.

*Cryptochiton Stelleri* Midd.

One full grown specimen is 7-valved, otherwise normal.

*Mopalia Heathii* n. sp.

Oblong, rather elevated, carinated, with nearly straight side slopes; surface smoothish to the naked eye, lusterless, and in color (1) olive-green with some lighter spots, or purplish maculation, or slight roseate suffusion, or (2) vivid red, with scattered blue spots.

Valves shaped as in *M. lignosa*, but without a median anterior projection of the tegmentum; the intermediate valves very faintly radially trisulcate at the sides, the anterior two grooves defining the low, slight and inconspicuous diagonal rib, the lateral areas not raised; entire surface very finely and evenly granulate, the granules small, rather pointed, separated, intervals very minutely, radially wrinkle-granulate. Anterior valve with a few faint, shallow radial furrows. Posterior valve with semicircular posterior outline, the mucro in front of the middle of tegmentum, profile of the surface in front of it convex, that of the posterior slope decidedly concave.

Interior deep rose color or slightly purplish ; sutural laminæ and sinus about as in *lignosa*. Teeth rather long and somewhat roughened, as in *lignosa*. Valve i with 8 slits ; ii-vii with 1-1 ; valve viii entirely "Ischnoid," with regular, crescentic insertion plate, cut by 7 or 8 slits, which are somewhat closer posteriorly ; no sinus behind.

Girdle leathery, nude except for solitary or two or three closely grouped long bristles at all or part of the sutures, one on each side of the head valve, and two behind the tail valve.

Gills about 25 on each side, not extending quite to the anterior end of the foot.

Length 25, width 12 mm. (dried specimen), or smaller.

In one specimen there are 9 bristles on each side and one in the middle in front. Another lacks this median bristle ; and in still another, some of the sutures are without bristles. In all, some of them are broken off close to the girdle, leaving only stumps or pores.

This form resembles *M. sinuata* and *imporcata* in the sutural bristles, but differs from them in sculpture and form of the tail valve. The latter is completely as in *Ischnochiton*, and its form is approached only by *M. acuta* Cpr., which however has a slight caudal sinus, much stronger sculpture, more depressed and more posterior mucro, and scattered hairs on the girdle, without sutural bristles. It is also blue-green or pale blue inside, while *M. Heathii* is rose colored. One of the specimens was dredged in 17 fms. ; station of the others unknown.

**Nuttallina Thomasi** n. sp.

General form oblong, rather depressed, not keeled dorsally ; surface granulose when not eroded. Color blackish or dark brown, with a whitish band on each side of the median line of back, or irregular whitish maculation ; girdle dark.

Intermediate valves short and wide, with a slight or hardly noticeable depression on each side of the jugum, and others in front of and behind the scarcely defined, obsolete, diagonal convexity ; the anterior and posterior margins subparallel, slightly arcuate. Anterior valve granulate, without radial ribs, the posterior margin excavated mesially. Posterior valve with tegmentum slightly wider than the anterior, the obtuse mucro somewhat behind the middle.

Interior blue-green, with the area behind the valve-callus dark brown, or livid purplish, with light sutural laminæ and blue-green area behind the sinus. Slits in valve i, 9 or 10 ; valves ii to vii, 1-1 ; valve viii, 10 or 11. Teeth rather separated, those of valve i

unequal, slightly rugose outside; posterior tooth of valves ii to vii small, very obliquely directed forward; teeth of valve viii very short, strongly directed forward and roughened. Sinus wide and square, spongy, the area behind it transversely grooved. Eaves rather wide, "spongy" or porous.

Girdle sparsely covered with short, rigid, obtuse, glossy spines of a blackish-brown color, or occasionally some are whitish.

Gills in type specimen, 26 on left, 23 on right side; not quite reaching the anterior end of the foot. In another there are 23 on the left, 25 on the right side.

Length 15, breadth 8 mm., or smaller.

Pacific Grove, in small tide-pools 4 to 8 ft. above mean tide mark.

This species differs markedly from *N. Californica* ('Nutt.' Rve.) and *N. fluxa* (Cpr.)<sup>1</sup> in the shorter valves, lack of radial ribs on the anterior and intermediate valves, and more anterior mucro of the posterior valve, and the single slitting of valves ii to vii. I at first considered it a *Middendorffia*, but the girdle is like that of *Nuttallina*, not having the peculiarly modified spines of the Mediterranean *Middendorffia*. It lives with a small form of *Trachydermon* (*Cyanoplax*) *Raymondi*, which is much more numerous in the tide-pools. From that species it may be known by the spiny girdle. Nearly all the specimens collected are much eroded.

This species may be considered the type of a new subgenus of *Nuttallina*, with the following differential characters: Intermediate valves with 1-1 slits; anterior valve not radially ribbed; posterior valve with the mucro post-median, but not terminal. Other characters as in *Nuttallina*.

At Mr. Heath's request, it is named in honor of Mr. Thomas, who found the first specimens.

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<sup>1</sup> = *Ch. scaber* Rve., 1847, not of Blainville, 1825.